

What is claimed is:

1. An electrode comprising:  
a heater arranged on a plane;  
a pair of ceramic-metal composites each arranged above and below the heater respectively so that the heater is positioned therebetween; and  
a base metal in which the heater and the ceramic-metal composites are cast.
2. An electrode comprising:  
a heater arranged on a plane;  
a core metal plate arranged substantially parallel to the plane and adjacent to the heater; and  
a base metal in which the heater and the core metal are cast.
3. The electrode according to claim 2, wherein a plurality of base metal communication holes are formed through the core metal plate.
4. The electrode according to any one of claims 1 to 3, wherein a shower head portion that supplies a gas is provided on a lower surface of the base metal.
5. The electrode according to any one of claims 1 to 4, wherein the electrode is configured so that a high frequency voltage is applied thereto.
6. A susceptor comprising:  
a heater arranged on a plane;  
upper and lower ceramic-metal composites arranged so that the heater is positioned therebetween; and  
a ceramic electrostatic chuck that attracts and holds an object to be treated, the electrostatic chuck having a coefficient of linear thermal expansion substantially the same as that of the upper ceramic-metal composite, and being joined to an upper surface of the upper ceramic-metal composite.

7. The susceptor according to claim 6 further comprising a base metal in which the heater and the upper and lower ceramic-metal composites are cast.

8. The susceptor according to claim 6 or 7, wherein the upper ceramic-metal composite and the electrostatic chuck are brazed together.

9. The susceptor according to claim 6 or 7, wherein the upper ceramic-metal composite and the electrostatic chuck are forge-welded together.

10. The susceptor according to claim 6 or 7, wherein the upper ceramic-metal composite and the electrostatic chuck are adhered together.

11. The susceptor according to any one of claims 6 to 10, wherein the susceptor is configured so that a high frequency voltage is applied thereto.

12. A plasma processing apparatus comprising:  
a processing vessel;  
an electrode including:  
a heater arranged on a plane;  
a pair of ceramic-metal composites each arranged above and below the heater so that the heater is positioned therebetween; and  
a base metal in which the heater and the ceramic-metal composites are cast; and  
a high frequency power sources that applies a high frequency voltage to the electrode.

13. A plasma processing apparatus comprising:  
a processing vessel,  
an electrode including:  
a heater arranged on a plane;

a core metal plate arranged substantially parallel to the plane and adjacent to the heater; and  
a base metal in which the heater and the ceramic-metal composites are cast; and  
a high frequency power sources that applies a high frequency voltage to the electrode.

14. The apparatus according to claim 13, wherein a plurality of base metal communication holes are formed through the core metal plate.

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15. The plasma processing apparatus according to any one of claims 12 to 14, wherein a shower head portion for supplying a gas is provided on a lower surface of the base metal.

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16. A plasma processing apparatus comprising:  
a processing vessel,  
a susceptor including:  
a heater arranged on a plane;  
upper and lower ceramic-metal composites arranged so that the heater is positioned therebetween;  
and  
a ceramic electrostatic chuck that attracts and holds an object to be treated, the electrostatic chuck having a coefficient of linear thermal expansion substantially the same as that of the upper ceramic-metal composite, and being joined to an upper surface of the upper ceramic-metal composite; and  
a high frequency power source that applies a high frequency voltage to the susceptor.

17. The plasma processing apparatus according to claim 16, wherein the heater and the upper and lower ceramic-metal composites are cast in a base metal.

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18. ~~The plasma processing apparatus according to claim 16 or 17, wher in th susceptor is provid d with heat transfer gas~~

passages that supplies a heat transfer gas to a surface of the electrostatic, the passage passing through the susceptor.

19. The plasma processing apparatus according to any one of claims 16 to 18, wherein the upper ceramic-metal composite and the electrostatic chuck are brazed together.

20. The plasma processing apparatus according to any one of claims 16 to 18, wherein the upper ceramic-metal composite and the electrostatic chuck are forge-welded together.

21. The plasma processing apparatus according to any one of claims 16 to 18, wherein the upper ceramic-metal composite and the electrostatic chuck are adhered together.

22. A method of making an electrode, comprising the steps of:

placing a heater and a pair of porous ceramics in a mold with a positional relationship where the pair of porous ceramics are arranged above and below the heater respectively so that the heater is positioned therebetween; and

pouring a molten base metal into the mold to cast the pair of porous ceramics and the heater in the base metal, thereby infiltrating the porous ceramic with the base metal in order to form a ceramic-metal composite.

23. A method of making a susceptor, comprising the steps of:

placing a heater and a pair of porous ceramics in a mold with a positional relationship where the pair of porous ceramics are arranged above and below the heater respectively so that the heater is positioned therebetween; and

pouring a molten base metal into the mold to cast the pair of porous ceramics and the heater in the base metal, thereby infiltrating the porous ceramic with the base metal in order to form a ceramic-metal composite.